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science when we see the relation of "rhombus" to a spinning top, and when we know that the Greeks called an angle by the suggestive word *glochis* (arrow head), that a surface was to them a *chroia* (color, or skin), and that a point was a *stigme* (puncture)! The Greek terms are, of course, of little moment, but the naive way of naming the geometric concepts will add a good deal of interest in teaching the subject.

There is, however, much more than this in the monograph. There is, for example, mention of the prophetic vision of the Greek geometers with respect to astronomy, and of the essential features of the doctrines of Pythagoras. There is also a statement, well worth reading, setting forth the influence of the Pythagorean brotherhood, even after the death of the founder. And with all this there is a brief discussion of the indebtedness of science to the labors of men like Aristotle, Heraclides, Democritus, and Anaxagoras.

The pamphlet can, no doubt, be ordered through the New York correspondent of the Cambridge Press, and is well worth reading by those who are interested in the better teaching of mathematics.

David Eugene Smith.

Éléments de Géométrie. By Alexis-Claude Clairaut. Paris, Gathier-Villars et Cie, 1920, 2 vols. Vol. I, pp. xiv + 95; vol. II, pp. 103.

Probably the most trite remark that anyone of our profession can make is that education is at present undergoing a tremendous change. The remark is true—that is, it is more or less true; it is true to us, just as a tree in a forest may seem gigantic to our eyes, but a commonplace thing to the aviator a mile above the earth's surface. Nevertheless it is probably a necessity that what we do should seem to us big with possibilities, so that we may be spurred on by laudable ambition.

Those of us who wish to see elementary geometry placed upon a more satisfactory foundation, at least so far as the teaching of the subject goes, will probably agree in a general way to such propositions as the following: (1) Geometry should begin with intuitive work, and especially with measuring; (2) in particular, we should first lead our pupils to employ the most natural means of measuring distances out of doors; (3) still more particularly, the pupils should see the value of indirect measurement in such cases as that of finding the distance across a stream; (4) simple constructions (drawing of perpendiculars, bisecting line segments, and the like) should early form a "bond" with motor activities; (5) figures should be studied as needed, not necessarily in "water-tight compartments"; (6) the incommensurable should not trouble the pupil in the initial stages; (7) the intuitive work in mensuration should lead to "something worth while," like the finding the area of an irregular field; (8) congruence propositions may well come rather late in geometry, instead of being given first as with Euclid; (9) simple instruments, such as the pupil can easily make, should play an important part; (10) deductive work should develop gradually from intuitive geometry; (11) similarity should lead to the drawing of figures to scale and to the finding of distances and areas by the use of the resulting drawings; (12) the introduction to demonstrative work may well dispense with the extreme formalism of Euclid, and with any extended array of axioms; (13) the pupil should be allowed to postulate many geometric facts that Euclid would have proved; (14) the division of the subject matter into "books" is not a necessity, however much it may be desirable for certain reasons; (15) there is more than one method of demonstrating a theorem like the Pythagorean Proposition, and it is desirable to experiment upon others besides the one that Schopenhauer called "the rattrap proof"; (16) it is not necessary to take as many propositions as are found in the older books, and the corollary is coming to be considered much less valuable than was once thought; (17) solid geometry may also be much reduced in extent and much simplified in presentation; (18) the essential feature of good teaching is to make the subject interesting.

All these points are recognized by M. Clairaut; they have the flavor of the best experimental schools of today; and any one of them might well be the subject of an earnest address before an association of teachers of mathematics. For this reason, we may well welcome this recent publication and may commend it to all who wish for better geometry in our high schools.

Another point of value in relation to the little treatise is that it is the work of one of the best known mathematicians of

France. To have a thoroughly modern presentation of geometry, embodying the best thoughts of some of our most advanced teachers, and presented by such a genius as M. Clairaut—this is refreshing.

What is the most interesting thing about the work, however, is that Clairaut, one of the world's infant prodigies, wrote it in 1741. When only ten years of age he had read Lhopital's analytic treatise on conics; when only thirteen he presented to the Academie des Sciences a memoir of higher curves; when he was sixteen years of age he presented another memoir on curves of double curvature; two years later he was admitted to the Academie; when he was twenty-three he was made a member of a committee composed of some of Europe's greatest scientists in the measurement of a degree of a meridian; and when, at the age of fifty-two, he passed away, France lost one of her most brilliant writers and imaginative mathematicians.

Perhaps the greatest lesson that this reprint of Clairaut's well-known geometry can teach us is the lesson of humility. We feel that we have made some great discovery in education, that some committee of which we are a member is revolutionizing the curriculum, that our pet experiment is the most important one that has ever been made in that field, that the past is mostly bad but that we shall help to make the future mostly good. Such feelings are natural; the world's inventions and discoveries have been made as the result of such confidence in self. But it is well for us all to understand that our ideas have rarely any element of novelty and that some portion of our time may profitably be spent upon a study of the attempts of our predecessors.

In mathematics we have always had the contest between the utilitarian and the ideal; between the "real problem" and the fanciful; between the psychological and the logical in the presentation of the subject. The "problem method," the "project," the "laboratory method," "mathematics in the field," the "informational problem," "general mathematics," "fusion," the "ratio method"—all these and such as these have been as thoroughly presented in the centuries past as Clairaut presents the intuitive and informal approach to geometry in this little classic. All of this should make us humble in our great educational theories, but it should not in the least discourage us in the attempt to advance. Rather should it inspire us to read with greater care the works of the leaders in the world's progress and to profit by the permanent features which they contain.

DAVID EUGENE SMITH.

Junior High School Mathematics. By WALTER W. HART. D. C. Heath and Co., New York, 1921. Pp. 226.

The first of a three-book series, designed for the seventh grade. Emphasizes the fundamentals, intuitive geometry, and percentage.

The Alexander-Dewey Arithmetics. By GEORGIA ALEXANDER and JOHN DEWEY. Longmans, Green and Co., New York and Chicago, 1921.

A three-book series of arithmetics for the first eight grades. More than usual emphasis upon socialization and informational backgrounds of arithmetic.

Mathematics for Shop and Drawing Students. By H. M. KEAL and C. J. LEONARD. John Wiley and Sons, New York, 1921. Pp. 213.

For industrial workers and students who have not completed the courses in high school mathematics. Develops the essentials of mathematics for these students through illustrations from the shop and laboratory.

Mathematics for Electrical Students. By H. M. KEAL and C. J. LEONARD. John Wiley and Sons, New York, 1921. Pp. 230.

Similar to above, with illustrations from the field of electricity.

Arithmetics. By EUGENE HERZ and MARY G. BRANTS. The John C. Winston Company, Philadelphia, 1920.

A three-book series for the elementary school, emphasizing commercial applications.

The Anderson Arithmetics. By ROBERT F. ANDERSON. Silver Burdette and Co., Boston, New York and Chicago, 1921.

In these three books the author claims to have used "the results of modern school practice, experiments, and investigations contributed by many who have labored in this field to discover the inherent difficulties in the subject itself, to improve methods of instruction, and to eliminate useless subject matter."

Analytic Geometry. By CLAUDE IRWIN PALMER and WILLIAM CHARLES KRATHWOHL. McGraw-Hill Book Company, New York, 1921. Pp. 347.

Treats plane and solid analytic geometry and gives a brief introduction to the Calculus.